

THE ANALYST.

JULY, 1894.

PROCEEDINGS OF THE SOCIETY OF PUBLIC ANALYSTS.

THE usual Monthly Meeting of this Society was held on June 6th at the rooms of the Chemical Society, Burlington House. In the absence of the President, Mr. Otto Hehner took the chair.

The minutes of the last meeting were read and confirmed.

Mr. Allen then read a paper on "The Examination of Urine for Sugar," the publication of which is unavoidably held over.

Mr. Chattaway now read the two following papers :

ON THE COMPOSITION OF CHEESE.

BY WM. CHATTAWAY, T. H. PEARMAIN, AND C. G. MOOR.

WE were informed some months ago that a cheese was again being imported into this country in which the butter-fat had been largely replaced by other oils and fats.

We have not until recently succeeded in obtaining a specimen, but a sample of cheese, purchased under the Food and Drugs Act a short time ago, gave such abnormal results when examined by one of us, that we thought it would be of interest to compare in a table the figures representing the proximate constituents of the more commonly-used cheeses, which, so far as we are aware, have not recently been published.

We are unable to judge of the number of cheese samples examined last year under the Food and Drugs Act, but there is little cause for doubt but that the number is even more miserably disproportionate in the case of this commodity than it is in the case of many other articles.

In addition to this, we are aware that a cheese will shortly be placed on the market in this country in which the butter-fat is largely, if not entirely, replaced by other fats; and this cheese will doubtless be palmed off on the public as ordinary cheese, containing the due proportion of genuine butter-fat.

It would be out of place here to discuss the dietetic value of butter-fat over that of all other varieties; but it is insisted on by the best authorities that fat derived from milk is absorbed directly into the system, which is said to be the case of no other fat with which we are acquainted. Besides, it is clearly a fraud on the customer that any of the butter-fat should be abstracted, and an inferior, or, indeed, any other article substituted for it; for if the purchaser does not buy a cheese under a distinct title showing that it is made from skimmed or separated milk, he has a right to expect that the constituents in his cheese should bear the same proportions to one another as they do in ordinary milk.

It would be exceedingly interesting if it were possible to make any tests which would give an indication as to how far the fat and casein are assimilable, and which is most valuable from a food standpoint; but as we fear these have still to be discovered, we have endeavoured to make the chemical examination as complete as possible, and have to that end determined the following constituents, *i.e.*, water, ash, fat, and nitrogen, and have further examined the fat by the Reichert-Wollny and the Valenta test.

CHEESE RESULTS.

No. of Sample.	Name of Sample.	Water.	Ash.	Fat.	Reichert c.c. $\frac{N}{10}$	Nitrogen.	Casein.	Valenta Test.
1	Cheddar (English)...	33.0	4.3	29.5	24.2	4.31	27.4	39.0° C.
2	Cheddar (English)...	35.5	4.2	25.6	28.8	4.39	27.8	42.0
3	Cheddar (English)...	33.8	4.1	30.5	26.4	4.20	26.7	31.0
4	Cheddar (Canadian)	33.3	3.6	30.6	24.0	4.34	27.6	41.5
5	American ...	29.8	3.7	33.9	26.2	4.76	30.3	47.5
6	American ...	30.6	3.6	27.7	3.0	4.84	30.8	82.0
7	American ...	29.1	3.7	35.3	23.0	4.41	28.1	46.0
8	American ...	24.1	3.9	32.0	25.8	—	—	—
9	American ...	27.0	4.5	30.1	24.8	—	—	—
10	American ...	25.0	7.9	20.1	30.4	—	—	—
11	American ...	27.2	4.4	30.9	25.4	—	—	—
12	American ...	28.1	4.5	33.0	25.6	—	—	—
13	Gorgonzola ...	40.3	5.3	26.1	22.1	4.36	27.7	26.5
14	Gorgonzola ...	33.9	4.6	26.7	23.6	4.06	25.8	45.0
15	Dutch ...	41.8	6.3	10.6	27.0	5.11	32.5	40.0
16	Dutch ...	37.6	6.5	22.5	23.0	4.58	29.1	49.0
17	Gruyère ...	28.2	4.7	28.6	30.0	4.93	31.3	37.5
18	Gruyère ...	35.7	3.7	31.8	31.1	4.49	28.7	41.0
19	Stilton ...	19.4	2.6	42.2	29.0	4.73	21.1	38.5
20	Stilton ...	21.2	2.9	45.8	32.0	4.14	26.3	45.5
21	Cheshire ...	37.8	4.2	31.3	31.6	4.03	25.7	43.0
22	Cheshire ...	31.6	4.4	35.3	31.8	4.16	26.5	47.0
23	Double Gloucester...	33.1	5.0	23.5	31.4	4.99	31.8	38.0
24	Double Gloucester...	37.4	4.6	28.1	32.3	4.45	28.3	41.0
25	Camembert...	47.9	4.7	41.9	31.0	3.43	21.8	32.0
26	Camembert...	43.4	3.8	22.6	35.0	3.83	24.4	33.0
27	Parmesan ...	32.5	6.2	17.1	28.0	6.86	43.6	28.0
28	Roquefort ...	29.6	6.7	30.3	36.8	4.45	28.3	19.0
29	Double Cream ...	57.6	3.4	39.3	31.2	3.14	19.0	40.0
30	Bondon ...	39.5	0.7	24.4	29.4	1.48	9.4	42.0
31	Cream (York)	63.1	1.4	6.5	29.0	2.76	17.9	41.0

The following figures call for notice, *viz.*, water in the Camemberts, Nos. 25 and 26, 48 and 43 per cent. respectively; the York cream 63 per cent., and the double cream 57.

Fat is very deficient in the following: York cream, 6.5; Parmesan, 17.1; and Dutch, No. 1, 10.6.

The nitrogen is very low in the Bondon cream, namely, 1.48; in the York cream it is 2.6, and in the Parmesan reaches the highest amount of 6.86 per cent.

From the above figures we should conclude that none of the cheeses (excepting the Dutch and the so-called "cream" cheeses) have been prepared from milk from which fat has been removed. The Parmesan cheese is, however, low in fat.

We wish to call particular attention to the American cheese, No. 6. This is a margarine cheese.

We read in Battershall's "Food Adulteration" that in 1885 a special New York State Brand was adopted for "*pure cream cheese*," which he says had a very good effect, and accomplished much in the restriction of the sale of the spurious article.

In certain previous papers on the subject of cheese, it is stated that various anomalies may be introduced by the production of varying quantities of free fatty acids, ammonia, and lactic acid, as the ripening process goes on, and, with a view of ascertaining what changes take place, we intend to examine from time to time samples, which we are preserving, of the more commonly-used cheeses, particularly from a bacteriological aspect; and we hope to lay the results before the Society at no distant date.

As to the cause of the changes in composition, taste, and smell, we are satisfied that they are almost entirely due, in the first instance, to organized ferments, which may be checked or encouraged at will according to the conditions under which we cause the ripening to take place.

Seeing that digestible nitrogenous matter is thus converted into ammonia compounds, it would appear that, as far as the food value is concerned, the further the ripening or decomposition is carried the greater the loss of flesh-forming constituents.

We have in no case found boric acid present in any of the cheeses.

We have not examined the colouring matter either in the cheeses themselves or in their rind.

In conclusion, we would urge that cheese should not be so neglected by analysts and inspectors, and that attention should be more particularly directed to American cheeses.

Our thanks are due to Mr. Robert Waterhouse and Mr. Martin Priest for their valuable assistance in connection with this paper.

NOTE ON THE VALENTA ACETIC ACID TEST.

By WM. CHATTAWAY, T. H. PEARMAIN AND C. G. MOOR.

VALENTA'S test has given in our hands such general satisfactory results that we are somewhat surprised that it has not held a more important position than it appears to have done. The acetic acid turbidity temperature has the undeniable disadvantage of being one of those empirical methods of analysis which cannot be regarded with the same satisfaction as the many estimations which are so definite as to be expressed in the form of a chemical equation. We contend, however, that notwithstanding this fact, the value of this test is by no means small, and, further, that this disadvantage equally applies to the Reichert-Wollny, the Maumène and other important determinations.

Certain precautions have to be noted in order to obtain concordant observations, and we wish to call attention to the following points :

- (1) Strength of acetic acid.
- (2) Presence of water in the oil or fat under examination.
- (3) The temperature to which the oil or fat has been previously heated.
- (4) The method of stirring and observing the turbidity point.

1. We have paid considerable attention to the most suitable strength of acid to use, and after a somewhat lengthy trial have adopted an acid which contains 99.50 per cent of acetic acid.

In this connection we would like to call attention to the remarks made by Mr A. H. Allen in his "Commercial Organic Analysis," vol. ii., p. 26, in which he says that a slight variation in the strength of the acid employed is not of great importance. This is not in accordance with our experience, when working with an acid of the above-stated strength, and we believe that as the amount of water is increased the extreme sensitiveness of the turbidity test is diminished. On the other hand, there are certain reasons why an absolute acetic acid should not be used. It will be seen from this that acid of the strength specified by Valenta is more liable to give a little latitude in the exact strength of the acid to be employed, but that while such is the case, this advantage is entirely outweighed from the standpoint of sensitiveness.

2. The presence of moisture in the fat or oil under examination is probably one of the most fruitful sources of error, and we have found that in all cases it is advisable to filter the samples through a perfectly dry filter paper before making the test. It is well known to oil importers that the presence of minute quantities of water in the oil seriously affects the appearance of the oil as soon as the temperature falls, and that an oil may be quite brilliant and yet contain an estimable quantity of water. We believe that this fact was not quite recognised by Valenta, and also that it explains, or partly explains, the difference in figures obtained by Valenta in the same class of oil.

Olive-oil has shown the most serious variations in this respect, and it is the oil most likely to contain traces of water, owing to the methods of pressing and the variable condition of the fruit at the time it was pressed.

3. When an oil or fat is unduly heated, either at the time the test is being made or previously, the determination of the turbidity figure must not be relied upon. In all cases the sample must be dealt with as cautiously as it can be in this respect, and we would recommend that the temperature of 100°C. should never be exceeded in the preparation of an oil or fat for the test.

4. The method which is usually adopted consists in stirring together by means of a thermometer equal volumes of acetic acid and the sample in a test-tube after the solution is effected, removing the source of heat, and noting the temperature at which turbidity appears.

This is very well as a rough sorting test, and answers well enough in many cases; but we have now adopted the plan of conducting the test in a bath of water which has been raised to a suitable temperature; by these means we obviate an error which arises from the unequal cooling of the test-tube, and instead of a kind of tiny

waterspout appearing in the tube, the whole of the contents of the tube become turbid instead of doing so locally.

We would like to call attention to a comparatively perfect method of working the test, which, notwithstanding its extreme simplicity, is capable of giving results which may be regarded as absolutely concordant.

In some methods of analysis it is not expedient to arrive at very exact results owing to length of time necessary, but we hope it will be generally regarded by this society that a simple test like this, which enables a reliable, and even quantitative, result to be obtained in a few minutes, will allow of a little time being spent in order to obtain highly concordant figures.

Instead of using an ordinary test-tube, we use a short and somewhat thick test-tube of about $4" \times \frac{1}{2}"$, into which a well-fitting stopper has been ground. We then weigh into the tube 2.75 grammes of the fat, and measure from a burette, or other suitable arrangement, 3.0 c.c. of the acetic acid. The tube is then stoppered, and placed in a beaker of warm water, increasing the heat until, after well shaking the tube, the contents become quite clear. The source of heat is then removed, and the test-tube so placed that it is in the centre of the beaker of heated water, and by means of a thermometer attached to the test-tube by a rubber band, the whole is allowed to rest until we note the change from brilliancy to turbidity. The change is very definite, and can be repeated over and over again with a maximum error of about 0.25 of a degree. If preferred, the thermometer may be used as a thermometer stopper to the test-tube, but it is not in our opinion necessary, as it is not always convenient to have a few dozens of thermometer-stoppered tubes, whereas simply stoppered tubes are more easily obtained and equally satisfactory.

It occurs to us that the foregoing remarks may appear to reflect to some extent upon the value of the Reichert-Wollny and other determinations. Such is very far from our intention. Food analysis is now no simple matter, and every care has to be exercised before one is in a position to state whether a food sample is genuine or not.

We realize that every determination that can throw light, however small, upon the analysis of food, and particularly of such commodities as butter and cheese, is most valuable. In this sense, and in this purely, we would suggest that the use of this method of analysis be taken up by those who have not already done so.

Finally, we do not wish to place the Valenta test in too high a position. There are still some oils which give strange and apparently inconsistent results.

The investigations into these irregularities are already under our consideration, and we believe that they are capable of simple explanation in most cases. It must not, however, be supposed that an oil may be purified by several methods, and that then each of such purified samples will give the same result. We repeat that this is a sensitive test, and as such it is quite inconsistent to expect that under such conditions as those cited we should not get a different result.

Its use as a valuable indication as to the nature of butter, margarine proper, and mixtures of these is now established.

We have placed on the blackboard just one instance of this—a sample of margarine, and of butter, and definite mixtures of the same.

The calculations are based upon the figures obtained from the butter and margarine proper as initial figures; but these figures are quite within the usual range, and these determinations were made without any important care, such as that specified in the improved method to which we have referred:

PRESENT.			FOUND.	
Mixture.	Butter.	Margarine.	Butter.	Margarine.
1	10	90	8.6	91.4
2	20	80	20.7	79.3
3	30	70	31.0	69.0
4	40	60	41.3	58.7
5	50	50	50.0	50.0
6	60	40	58.6	41.4
7	70	30	70.7	29.3
8	80	20	81.0	19.0
9	90	10	93.1	6.9

The following table contains some further figures taken upon a variety of pure oils, which we think may be of some interest. These results, however, must not be regarded as standards:

ACETIC ACID TURBIDITY TEST.

	°C.		°C.		°C.
Butter-fat :		Cottonseed ...	75.0	Japan Fish ...	19.0
(Number of samples		" ...	71.0	Herring ...	90.0
examined, 24)		" ...	85.0	Nigerseed ...	68.5
Highest ...	39.0	" ...	86.0	Sunflower ...	59.0
Lowest ...	29.0	" ...	89.0	" ...	62.5
Mean ...	36.0	" ...	88.0	Bottlenose ...	80.0
Margarine :		Cod ...	31.0	" ...	96.0
(Number of samples		" ...	29.0	Lard-oil ...	75.0
examined, 5)		" ...	26.5	" ...	76.0
Highest ...	97.0	" liver ...	76.0	" ...	75.0
Lowest ...	94.0	" " ...	72.0	Lard ...	98.0
Mean ...	95.5	" " ...	73.0	" ...	97.0
Olive (Bari) ...	91.0	Colza (German) ...	83.0	" ...	98.0
" (Smyrna) ...	91.0	Rape ...	63.0	" ...	97.0
" (Lucca) ...	90.0	" ...	77.0	Neat's-foot ...	72.0
" ...	91.0	" ...	77.0	Tea ...	78.0
" ...	89.0	" ...	78.0	Rosin ...	56.0
" ...	86.0	Peach-kernel ...	82.0	" ...	42.0
" ...	85.0	" ...	82.0	Jamba ...	above 100.0
" ...	90.0	Ground-nut ...	72.0	" ...	100.0
" ...	83.0	" ...	73.0	" ...	100.0
" ...	85.0	" (Arachis) ...	73.5	Cabbage ...	100.0
Almond ...	87.0	Linseed ...	46.0	Beef-stearin ...	100.0
" ...	84.0	" ...	52.0	Lard ...	100.0
" ...	82.0	" ...	48.0	Castor not above	18.0
" ...	82.0	Seal ...	70.0	Woolgrease olein	18.0
" ...	72.0	" ...	65.0	not above	18.0
Cottonseed ...	71.0	Japan Fish ...	47.5		

In the absence of Mr. Jones, Mr. Bevan read the following paper :

TURBIDITY TEMPERATURE OF OILS AND FATS WITH GLACIAL ACETIC ACID.

By E. W. T. JONES.

THIS test, due to Valenta, is described by him in J. C. S., xlv., p. 1078, where he also gives results on certain oils.

I have been investigating this test, and although the hopes I had entertained of its usefulness, as an independent and totally distinct test for differentiating between those butters which, although genuine, are low in the usual butter characteristics according to chemical testing, and actual mixtures approximating such butters, have not been realized, I have ascertained a few facts concerning the test which I think are worth recording.

Valenta indicates the requisite strength of the acid by specific gravity, which he gives as 1056.2. This, according to the most reliable table I can find (Oudemans's), may mean 44 per cent. $\text{H}\bar{\text{A}}$, or 99.7 per cent. $\text{H}\bar{\text{A}}$. Of course the former strength is not "glacial," but I shall show that specific gravity is altogether inadequate to determine the fitness of the acid for oil-testing; indeed, it will need no further demonstration when I mention that 4 c.c. of water, added to 2,300 c.c. (a Winchester quart) of acid, lowered the turbidity temperature 5°C . This means that a difference of less than 0.2 per cent. in the $\text{H}\bar{\text{A}}$ effects this divergence, and it follows that a very small dilution of the strongest acid may make it absolutely useless for the test at all. The turbidity temperature, say, with a known sample of butter-fat, is the most delicate test I know of for adjusting the requisite strength of this strong acetic acid for the purpose in view.

An acid which by titration contained 98 per cent. (97.99) of $\text{H}\bar{\text{A}}$ gave with a butter-fat a temp. of 48°C .; the addition of 2 per cent. of water made it over 100°C .—quite unfit for use; 1 per cent. made it 79°C ., whilst 0.2 per cent. made it 55°C . This shows the importance, if this test is to be used to give at all comparable results, of adopting a scheme to secure exactly the right strength of acid, and the following is the course I have followed.

I have carefully filtered off some fat from a normal butter into a bottle, and this I employ to set every fresh batch of acid I use. I procure the best and strongest glacial acetic acid, and suppose I find it gives a temp. of 50°C . with my standard butter-fat, I carefully add water until the temp. with it is 60°C .; thus I know that whatever tests I make with this acid are strictly comparable with any previous tests I have made.

It is most important, too, that the relative proportions of the acid and fat or oil are pretty strictly adhered to, and absolutely necessary that the set proportion of the *fat or oil* to the acid is not exceeded; any error in measurement should lean to the full measurement of the acid, which does not make the difference that the converse proportion does. I make special pipettes, a narrow one delivering 3 grammes of water at 15.5°C . for the acid, and wider ones, with wider orifices, delivering

3 grammes of water at 15.5° C. for the fat. I measure all oils and fats at about 50° C.

The turbidity temperature of butter-fat varies from 40° to 70° C.—the general run being from 52° to 65° C. The following analyses show the temp. in conjunction with other estimations.

Turbidity temperature.	54° C.	56° C.	55° C.	60° C.	55° C.	56° C.	57° C.	41° C.	45° C.	59° C.	48° C.
Koettstorfer's deg.	226.8	224.0	226.2	220.0	223.4	226.2	225.1	224.5	225.7	217.8	221.2
Soluble acids ...	5.14	4.79	5.19	4.19	5.02	5.30	5.20	4.97	5.05	4.12	4.98
Insoluble acids ...	88.92	89.30	89.04	90.28	89.08	88.78	89.11	88.74	88.56	90.18	88.73
Reichert-Wollny ...	27.2	25.6	28.1	22.5	26.7	28.2	28.1	26.7	27.2	22.2	25.4
Equal to volatile acid, as butyric ...	4.79	4.50	4.95	3.96	4.69	4.97	4.95	4.69	4.79	3.91	4.47

Another sample had a temp. of 71° C., and gave a Reichert figure 23.9.

Margarine gives temp. 95° to 106° C., generally from 100° to 102° C.

A mixture of 4 parts of butter-fat, having temp. of 40° C., and 1 part margarine, having temp. of 95° C. gave a temp. of 52° C., against 51 calculated.

Another mixture of 27 parts butter-fat, of temp. 52° C., and 73 parts margarine, of temp. 105° C., gave a temp. of 92° C., against 90.7° C. calculated.

The following are the turbidity temperatures of other oils and fats I have tried with this same acetic acid :

Rape oil ...	...	...	...	...	101° C.
Sesame oil	...	...	...	...	77°
Linseed oil (i.)	...	...	...	...	53°
Linseed oil (ii.)	...	...	...	...	57°
Lard oil ...	...	...	...	...	96°
Cottonseed oil	...	...	...	...	76°
Olive oil ...	...	...	...	...	89°
Arachis oil (i.)	...	...	...	...	61°
Arachis oil (ii.)	...	...	...	...	88°

If any member desires to adopt the same strength of acid as used in my experiments, I shall be happy to communicate with him for the purpose.

DISCUSSION.

Mr. Allen thought the society were very much indebted to the authors of the paper on the acetic acid test, for the observations they had brought forward, and for their improved method of operating. He did not quite know why the authors adopted the weight of 2.75 grammes of oil instead of taking a measure of 3 c.c. It was adding a complication to the test, which he thought was not capable of giving results other than what might be called of a preliminary kind. He had met with acetic acid which it was necessary to freeze in order to render it strong enough to use for the test; but he had never realized that it was necessary to employ such very strong acid as the authors preferred. In stating as he did in 1866 in "Commercial

Organic Analysis" that the strength of the acetic acid employed was not of great importance, he had in mind the comparative results yielded by different oils, rather than the absolute turbidity temperatures. There was no doubt that the weaker the acid was the higher became the turbidity-point with all butters; but, then, the margarine point rose also. As Mr. Jones had stated, it was necessary to have a standard sample of butter with which to compare others. When the Valenta test for oils was first published, he suggested its possible application to butter, and it had since been used in his laboratory on several thousands of samples. As a preliminary or sorting test, he had found it exceedingly useful. The authors' experience showed that genuine butters gave turbidity temperatures varying as much as 10° C., so that the quantitative results could not be very precise; but the same objection applied to every test for butter, and as this was based on an entirely different principle from most others, it was distinctly of value; and he was glad to see that it had assumed an improved form. He was also interested to see that the olive oils gave such approximately constant results. He observed that figures for three specimens of cod oil and three specimens of cod-liver oil were given in the table. He would like to know whether Mr. Chattaway knew the history of these cod oils. When it came to the point, "cod oil" meant, or should mean, cod-liver oil. Hence, it was clear that, if the oil really came from the cod, there was no necessity to insert the word "liver," and therefore the cause of the difference in the results obtained was not apparent. The influence of the volume of acetic acid used had been investigated by Mr. G. H. Hurst (*Jour. Soc. Chem. Ind.*, vi. 22), who had also tried the plan of surrounding the tube with a beaker of water.

Mr. H. Droop Richmond wished to know how the strength of the acetic acid was determined. Titration was not a very accurate method when the acid was nearly 100 per cent. The indicator to be used had to be considered; and it was also possible to over-estimate, according to the carbon dioxide present in the solutions of the acid. It was further possible to under-estimate, according to the amount of carbon dioxide in the standard solution against which the alkaline solution was standardized, and these two errors would not necessarily compensate each other. He believed that the density would be the best means of estimating the strength, but it was not actually known what the density of 100 per cent. acetic acid was. Some tables had been published, but they did not agree very well. By far the best table was that of Oudemans, but it only extended to four places of decimals, and one could not be certain whether it was accurate to the fourth place. He had made some experiments which seemed to him to indicate that water was soluble in butter-fat to the extent of nearly a quarter of a per cent. He did not agree with Mr. Allen in thinking that Valenta's test was only of value as a preliminary one. He believed that it was almost as good a test as the density, and, in combination with others, promised to be valuable. As for the Reichert-Wollny, he thought it should not be too implicitly relied upon, as many methods which were looked upon as preliminary showed actually less variation in genuine samples. With regard to cheese, there were two rather interesting determinations, showing that the butter of sheep's milk differed from that of the cow, though Besana had not found any marked difference (Nos. 26 and 28 in the Reichert-Wollny figures). Sample No. 27, Parmesan cheese, was prepared from

skimmed milk. He thought that, as a general rule, all samples were distinctly suspicious in which the fat fell below the casein, estimated, as the authors of the paper had estimated it, by determining the nitrogen and multiplying by the factor, 6.38. Had Mr. Chattaway determined the amount of sodium chloride in the ash?

Mr. R. Bodmer found that the great trouble of the test was that no acetic acid of the requisite strength was readily obtainable.

The Chairman (Mr. Hehner) said that the figures did not show how nearly margarine could be determined in commercial samples, but how accurately two substances, separately known, could be re-estimated after having been mixed. He had experimented a good deal with the Valenta test, and once thought highly of it; but on fuller experience he had been disappointed, as was the case with all other methods of fat-analysis. Figures obtained from the examination of a limited number of samples always broke down on wider experience. Further, a slight alteration in the strength of the acid made a considerable difference in the figures. Even when using acetic acid from the same stock-bottle, the latter having been opened frequently, the acid changed in its action when the bottle was getting empty. The state of freshness of the butter also required consideration. In the acetic turbidity table given by the authors there were shown the results of 24 samples of butter-fat, and in a second table the Valenta figures of 26 samples of cheese-fat. The fresh butter-fats gave figures which varied only by 10° C.; but in the fats obtained from those cheeses which according to the Reichert number were almost certainly genuine and free from margarine, and carefully excluding cheeses which appeared to be "filled," the variation was from 19° to 45° C. Even excluding the Roquefort cheese, the variation was yet so great as to allow of the introduction of a large percentage of margarine, that percentage being not less than that covered by the variations in the figures obtained by other processes. That was the conclusion which was forced upon him by his practice in the laboratory, and which he was confirmed in, subject to any explanation which the writers of the paper now under discussion might offer. A very interesting point was raised which had been frequently before his mind; that was, What was the real significance of the Valenta test? Mr. Richmond justly endeavoured to attain the highest possible accuracy in everything. If the significance of the figures was not known, it seemed to him this high degree of accuracy was largely wasted. He had made inquiry into this matter, and found that the fat which crystallized from the acetic acid consisted of the saturated fatty compounds, whilst the unsaturated remained in solution. It seemed to him that these small mixtures up to about 15 or 20 per cent. were as undetectable by the Valenta as by any other process.

Mr. Cassal would like to know whether, in the authors' experience, the Valenta test was one which could be relied upon for the quantitative analysis of samples of butter, as the other processes now used could be relied upon. At first sight the authors' table appeared to be remarkable, and it looked as if they had arrived, by the use of the Valenta test, at a process whereby the amount of margarine that was actually present in an adulterated butter could be determined with an extraordinary degree of accuracy. But he understood that this table was merely intended

to represent the powers of the Valenta test when applied to mixtures of a particular butter and a particular margarine separately giving certain results with the Valenta test. There was, however, nothing to show that upon taking any mixed sample the Valenta test applied to it would enable one to detect the percentage of the adulterant with anything like such accuracy. Great caution should be exercised in drawing conclusions from a test founded upon conditions as yet not fully determined, and in regard to which but little in the way of satisfactory scientific explanation had as yet been given.

Mr. Chattaway, in reply, said that the reason why 2.57 grammes of fat were taken was with a view to as nearly as possible approximate the weight of 3 c.c. at a temperature of 40° C. He did not approve of Mr. Allen denoting the method as a mere sorting test. It was, in the opinion of the authors, quite as useful and valuable, if not more so, than the Reichert-Wollny. He could have wished not to have occasion to speak so strongly in favour of the Valenta test, seeing that it is not as yet fully understood; but the authors had every reason to regard the test as decidedly more valuable than the Reichert determination. The butters mentioned were taken from some examined during the past few weeks, and although not truly representing the *possible* variations of butter, they were fairly representative of the butters of commerce. The same remarks applied also to the margarines, the figures of which are recorded. So far as the table to which Mr. Cassal and Mr. Allen had called attention was concerned, the authors wished particularly that it should not be misunderstood. A butter and margarine were taken, mixtures made, and then, starting with the initial figures of the butter and margarine, the calculations were made. The cod oil was a crude specimen used for leather dressing. The authors had been able to buy the acid quite strong enough; indeed, they had had to dilute it down to the proper strength. Referring to Mr. Richmond's observations, the strength of the acid was determined as usual by baryta and phenolphthalein, and, in the opinion of the authors, this was quite satisfactory. Mr. Chattaway thought that the attempt to place the test in a higher position than it had usually held had been severely—too severely—dealt with by Mr. Hehner. It seemed that Mr. Hehner did not so much really disapprove of the test, as that he did not think *any* test was at the present moment perfect enough to deal with certain cases. Touching again the question of sensitiveness of the test, the authors were in a position to prove that, taking hundreds of figures and determinations into consideration, the Valenta test was capable of just twice the accuracy of the Reichert-Wollny. The explanation of the solution at certain temperatures of some fats and not others was dependent, in the speaker's belief, on the intermixibility question. Butyric acid, for example, existing in butter in combination with glycerin was readily soluble in acetic acid at a certain temperature, and this mixture then had the power of taking into solution the glycerin compounds of the higher fatty acids. The authors did not wish to place too much stress upon the Valenta figures obtained in the case of fat from cheese, owing to the imperfect knowledge of the changes which take place in the maturing of cheese.

Members of the Society are requested to send any remarks or suggestions they may desire to make in reference to the following Draft to the Secretaries, without delay, and in as condensed and systematic a manner as possible. The Committee of the House of Commons is now sitting and receiving evidence on the working of the Food Acts.

DRAFT OF A SALE OF FOOD AND DRUGS ACT, PREPARED BY THE COUNCIL OF THE SOCIETY OF PUBLIC ANALYSTS, JUNE, 1894.

AN ACT TO AMEND THE ADULTERATION OF FOOD ACTS, AND TO MAKE BETTER PROVISION FOR THE SALE OF FOOD AND DRUGS IN A PURE STATE.

WHEREAS it is desirable that the Acts now in force relating to the adulteration of food should be repealed, and that the law regarding the sale of food and drugs in a pure and genuine condition should be amended :

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled, and by the authority of the same, as follows :

1. From the commencement of this Act the statutes of the twenty-third and twenty-fourth of Victoria, chapter eighty-four of the thirty-first and thirty-second of Victoria, chapter one hundred and twenty-one, section twenty-four, of the thirty-third and thirty-fourth of Victoria, chapter twenty-six, section three, and of the thirty-fifth and thirty-sixth of Victoria, chapter seventy-four of the thirty-eighth and thirty-ninth of Victoria, chapter sixty-three, and of the forty-second and forty-third of Victoria, chapter thirty, shall be repealed, except in regard to any appointment made under them and not then determined, and in regard to any offence committed against them or any prosecution or other act commenced and not concluded or completed, and any payment of money then due in respect of any provision thereof.

2. The term "food" shall include every article used for food or drink by man, other than drugs or water, or any article intended to enter into or be used in the preparation of human food, and all flavouring matters and condiments.

The term "drug" shall include medicines for external or internal use.

The term "county" shall include every county, riding, and division, as well as every county of a city or town not being a borough.

The term "justices" shall include any police and stipendiary magistrate invested with the powers of a justice of the peace in England, and any divisional justices in Ireland.

DESCRIPTION OF OFFENCES.

3. No person shall mix, colour, stain, or powder, or order or permit any other person to mix, colour, stain, or powder, any article of food with any ingredient or material so as to render the article injurious to health, with intent that the same

may be sold in that state, and no person shall sell any such article so mixed, coloured, stained, or powdered, under a penalty in each case not exceeding fifty pounds for the first offence; every offence, after a conviction for a first offence, shall be a misdemeanour, for which the person, on conviction, shall be imprisoned for a period not exceeding six months with hard labour.

4. No person shall, except for the purpose of compounding as hereinafter described, mix, colour, stain, or powder, or order or permit any other person to mix, colour, stain, or powder, any drug with any ingredient or material so as to affect injuriously the quality or potency of such drug, with intent that the same may be sold in that state, and no person shall sell any such drug so mixed, coloured, stained, or powdered, under the same penalty in each case respectively as in the preceding section for a first and subsequent offence.

5. Provided that no person shall be liable to be convicted under either of the two last foregoing sections of this Act in respect of the sale of any article of food, or of any drug, if he shows to the satisfaction of the justice or court before whom he is charged that he did not know of the article of food or drug sold by him being so mixed, coloured, stained, or powdered as in either of those sections mentioned, and that he could not with reasonable diligence have obtained that knowledge.

6. No person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance, and quality of the article demanded by such purchaser, under a penalty not exceeding twenty pounds.

In any prosecution under this Act for selling to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance, and quality of the article demanded by such purchaser, it shall be no defence to any such prosecution to allege that the purchaser, having bought only for analysis, was not prejudiced by such sale. Neither shall it be a good defence to prove that the article of food or drug in question, though defective in nature or in substance or in quality, was not defective in all three respects.

Any drug sold under any name included in the British Pharmacopœia shall be required to comply with the description, character, and tests for such drug as specified in the latest edition, with amendments, of the "British Pharmacopœia," provided that the drug be not included in the list of exceptions included in Schedule II. of this Act.

7. No person shall sell any compound article of food or compounded drug which is not composed of ingredients in accordance with the demand of the purchaser, under a penalty not exceeding twenty pounds.

8. Provided that no person shall be guilty of any such offence as aforesaid in respect of the sale of an article of food or a drug not recognised by the British Pharmacopœia mixed with any matter or ingredient not injurious to health, and not intended fraudulently to increase its bulk, weight, or measure, or to conceal its inferior quality, or any article of food or a drug deficient in any material constituent, if at the time of delivering such article of food or drug he shall supply to the person receiving the same a notice, by a label distinctly and legibly written or

printed, affixed to the containing vessel or parcel, and on the outside wrappers of the article or drug, in characters more prominent than any others, upon any label or other thing upon or with such article of food or drug, describing such article of food or drug as a mixture, and naming the ingredients thereof and their relative proportions, or declaring its deficiency or deficiencies.

It shall be no defence, under this section, to plead the accidental deterioration of the article, or accidental abstraction or spontaneous separation or evaporation of the ingredients.

APPOINTMENT AND DUTIES OF ANALYSTS, AND PROCEEDINGS TO OBTAIN ANALYSIS.

10. In the city of London and the liberties thereof the Commissioners of Sewers of the city of London and the liberties thereof, and in all other parts of the Metropolis, the vestries and district boards acting in execution of the Act for the better local management of the metropolis, the court of quarter sessions of every county, and the town council of every borough having a separate court of quarter sessions, or having under any general or local Act of Parliament or otherwise a separate police establishment, may, as soon as convenient after the passing of this Act, where no appointment has been hitherto made, and in all cases as and when vacancies in the office occur, or when required so to do by the Local Government Board, shall for their respective city, districts, counties, or boroughs, appoint one or more persons possessing competent knowledge, skill and experience, as analysts of all articles of food and drugs sold within the said city, Metropolitan districts, counties, or boroughs, and shall pay to such analysts such remuneration as shall be mutually agreed upon, and they shall not remove them during good behaviour, and all appointments, remunerations, and removals shall at all times be subject to the approval of the Local Government Board, in consultation with the Board of Reference provided for in section 30, who may require satisfactory proof of competency to be supplied to them, and give their approval absolutely, or with such modifications as to the conditions of appointment as they may deem desirable. Provided, that no person shall hereafter be appointed an analyst for any place under this section who shall be engaged directly or indirectly in the manufacture or sale of food or drugs in such place.

In Scotland the like powers shall be conferred and the like duties shall be imposed upon the commissioners of supply at their ordinary meetings for counties, and the commissioners or boards of police, or where there are no such commissioners or boards, upon the town councils for boroughs within their several jurisdictions; provided that one of Her Majesty's Principal Secretaries of State in Scotland shall be substituted for the Local Government Board of England.

In Ireland the like powers and duties shall be conferred and imposed respectively upon the grand jury of every county and town council of every borough; provided that the Local Government Board of Ireland shall be substituted for the Local Government Board of England.

12. Any purchaser of an article of food or of a drug in any place being a district, county, city, or borough where there is any analyst appointed under this

or any Act hereby repealed shall be entitled, on payment to such analyst of ten shillings and sixpence, or if there be no such analyst then acting for such place, to the analyst of another place of such sum as may be agreed upon between such person and the analyst, to have such article analysed by such analyst, and to receive from him a certificate of the result of his analysis.

13. (a) Any medical officer of health, inspector of nuisances, or inspector of weights and measures, or any inspector of a market, or any police constable, or other duly authorized person under the direction and at the cost of the local authority appointing such officer, inspector, or constable, or charged with the execution of this Act, may procure any sample of food or drugs, and shall submit the same to be analysed by the analyst of the district or place for which he acts, or if there be no such analyst then acting for such place to the analyst of another place, and such analyst shall, with all convenient speed, analyse the same and give a certificate to such officer, wherein he shall specify the result of the analysis.

(b) Any person authorized to take samples under this clause may procure at any railway-station, or elsewhere during transit, whether within or outside of the district in which he is empowered to act, or at the place of delivery, any sample of any article of food or drug which may be consigned or addressed to any person or persons within the limits of his district in pursuance of any contract for the sale to such consignee, and such officer shall submit the same to the public analyst of the district appointing him, and the same shall be analysed, and proceedings shall be taken and penalties, on conviction, be enforced in the like manner in all respects as if such officer, inspector, or other person had purchased the same from the seller or consignor under section 13 (a) of this Act.

The seller or consignor or any person or persons entrusted by him for the time being with the charge of such article, if he shall refuse to allow such officer, inspector, or constable to take the quantity which such officer, inspector, or constable shall require for the purpose of an analysis, shall be liable to a fine not exceeding ten pounds.

14. The person purchasing any article with the intention of submitting the same to analysis shall, after the purchase shall have been completed, forthwith notify to the seller, or his agent selling the article, his intention to have the same analysed by the public analyst, and shall, except in cases covered by clause 15, offer to divide the article into three parts to be then and there separated, and each part to be marked and sealed or fastened up in such manner as its nature will permit, and shall, if required to do so, proceed accordingly, and shall leave one of the parts with, or cause it to be delivered to, the seller or his agent.

He shall afterwards retain one of the said parts for future comparison, excepting in cases covered by clause 15 of this Act, and submit the third part to the analyst.

15. If the seller, or his agent, do not accept the offer of the purchaser to divide the article purchased in his presence, the analyst receiving the article for analysis shall divide the same into two parts, and shall seal or fasten up one of those parts and shall cause it to be delivered, either upon receipt of the sample or when he

supplies his certificate to the purchaser, who shall retain the same for production in case proceedings shall afterwards be taken in the matter.

In cases where the article purchased cannot be conveniently divided or where its division at the time of sale would militate against the accuracy of the analysis or where samples are taken under section 13 (a), the whole of the article purchased shall be submitted to the analyst, who shall divide the same into two parts and fasten up and seal one of those parts, and shall cause it to be delivered, either upon receipt of the sample, or when he supplies his certificate, to the purchaser, who shall retain the same for production in court in case proceedings be taken. If the course of procedure directed by clause 14 has been omitted owing to the nature of the article, and not by refusal of the vendor to have the division forthwith made, the analyst shall specially report in his certificate whether the article was of such a character as to justify a departure from the course directed in clause 14.

16. A person requiring an article to be analysed may deliver the same personally, or by deputy, at the office of the analyst, or such article may be forwarded to the analyst by registered post, and the charge for the transmission of such article shall be deemed one of the charges under this Act or of the prosecution, as the case may be, and samples so forwarded shall be deemed to be delivered by the purchaser.

17. If any such officer, inspector, or constable, as above described, shall apply to purchase any article of food or any drug exposed to sale, or intended for sale on any premises or in any shop or stores, and shall tender the price for the quantity which he shall require for the purpose of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such officer, inspector, or constable, such person shall be liable to a penalty not exceeding ten pounds.

Any officer, inspector, or constable, as above described, may, without going through the form of purchase, but otherwise acting in all respects with the aforesaid provisions of the Act, take from any shop, premises, store, warehouse, or in any street or open place of public resort, such quantity of any article of food and drug exposed for sale, on sale, or intended for sale, as may be required for the purpose of analysis, tendering the price for the quantity he shall require. Any dealer or his agent who shall refuse to supply the said article to such officer, inspector, or constable, shall be liable to a penalty not exceeding ten pounds. Any street or open place of public resort shall be held to come within the meaning of this section.

18. The certificate of the analysis shall be in the form set forth in the schedule hereto, or the like effect, and shall, when reasonably practicable, state the nature and proportion or proportions of such foreign ingredient or ingredients found on analysis, deficiency of strength or extent of deterioration or evaporation, but the analyst shall not be required to give the analytical data in his certificate on which his opinion is based.

18a. Every Local Authority empowered under sections 10 and 11 of this Act shall cause one or more of the officers specified under clause 13 of this Act to submit samples to the public analyst for analysis, the number of such samples being not less

than one sample per annum for every 1,000 inhabitants living within the area of such Local Authority.

Should such Local Authority refuse or neglect to submit samples for analysis, or submit a smaller number than one for every 1,000 inhabitants per annum, the Local Government Board may appoint an officer or officers for the purpose of obtaining samples for analysis by the public analyst, and to take proceedings against offenders. The cost of such appointment, purchase, and proceedings shall be borne by the Local Authority or Authorities.

19. Every analyst appointed under any Act hereby repealed or this Act shall report quarterly to the Authority appointing him the number of articles analysed by him under this Act during the foregoing quarter, and shall specify the result of each analysis and the sum paid to him in respect thereof, and such report shall be presented at the next meeting of the Authority appointing such analyst, and every such Authority shall annually transmit to the Local Government Board, at such time and in such form as the Board shall direct, a certified copy of each such quarterly report.

PROCEEDINGS AGAINST OFFENDERS.

20. When the analyst, having analysed any article, shall have given his certificate of the result, from which it may appear that an offence, or offences, against one or more of the provisions of this Act has been committed, the person causing the analysis to be made may take proceedings for the recovery of the penalty, or penalties, herein imposed for such offence, or offences, before any justices in petty sessions assembled having jurisdiction in the place where the article sold was delivered to, or obtained by, him in a summary manner.

In all prosecutions under this Act, except as hereinafter provided, the summons to appear before the magistrates shall be served upon the person or persons charged with violating the provisions of the said Act within a reasonable time, and in the case of a perishable article, not exceeding twenty-eight days from the time of the purchase from such person of the food or drug, for the sale of which in contravention to the terms of the Act the vendor is rendered liable to prosecution, and particulars of the offence or offences against the said Act of which the seller is accused, and also the name of the prosecutor, shall be stated on the summons, and the summons shall not be made returnable in a less time than seven days from the day it is served upon the person or persons summoned.

Every penalty imposed by this Act shall be recovered in England in the manner prescribed by the eleventh and twelfth Victoria, chapter forty-three. In Ireland such penalties and proceedings shall be recoverable, and may be taken with respect to the police district of Dublin metropolis, subject and according to the provisions of any Act regulating the powers and duties of justices of the peace for such district, or of the police of such district; and with respect to other parts of Ireland, before a justice or justices of the peace sitting in petty sessions, subject and according to the

provisions of "The Petty Sessions (Ireland) Act, 1851," and any Act amending the same.

Every penalty herein imposed may be reduced or mitigated according to the judgment of the justices.

21. At the hearing of the information in such proceeding the production of the certificate of the public analyst shall be sufficient evidence of the facts therein stated, but the certificate may be supplemented by the personal evidence of the public analyst, and that of experts or other witnesses. If the defendant shall so require it, and give due notice of the fact, the public analyst shall be called as a witness. When the presence of the public analyst is required by the defendant, reasonable remuneration and expenses shall be allowed.

At the hearing of the case the part of the article retained by the person who purchased it, or which was returned to him by the public analyst, shall be produced. The defendant may, if he think fit, tender himself and wife to be examined on his behalf, and he or she shall, if he so desire, be examined accordingly.

No certificate, other than that of the public analyst, shall be received in evidence, unless supported by the oral evidence of the analyst giving the certificate.

22. In the event of conflict of evidence in any proceedings under this Act, the justices before whom any complaint may be made, or the court before whom any appeal may be heard, may, upon the request of either party, in their discretion cause any article of food or drug to be sent to the Commissioners of Inland Revenue, who shall thereupon direct the chemical officers of their department to analyse the same, and give a certificate to such justices of the result of the analysis. The chemical officers of Somerset House shall state in their certificates whether the article, in their opinion, is genuine or adulterated, or is, or is not, of the nature, substance or quality of the article indicated in the summons, and whether their analysis is in substantial agreement with that of the public analyst, and whether at the time they made the analysis the article was in such a condition as to allow of the results obtained by its analysis to be fairly comparable with those obtained by the public analyst. And the justices before whom the case may be heard may, at the request of either party, require the attendance of the officers of Somerset House who made the analysis, to give evidence in explanation of their certificate, and shall give a decision with the whole of the evidence before them. And the expense of such reference analysis and of the attendance of the chemical officers of the Inland Revenue Department, if required, shall be paid by the plaintiff or the defendant as the justices may by order direct.

23. Any person who has been convicted of any offence punishable by any Act hereby repealed or by this Act by any justices may appeal in England to the next general or quarter sessions of the peace which shall be held for the city, county, town, or place wherein such conviction shall have been made, provided that such person enter into a recognisance within three days next after such conviction, with two sufficient sureties, conditioned to try such appeal, and to be forthcoming to abide

the judgment and determination of the court at such general or quarter sessions, and to pay such costs as shall be by such court awarded; and the justices before whom such conviction shall be had are hereby empowered and required to take such recognisance; and the court at such general or quarter sessions are hereby required to hear and determine the matter of such appeal, and may award such costs to the party appealing or appealed against as they or he shall think proper.

In Ireland any person who has been convicted of any offence punishable by this Act may appeal to the next court of quarter sessions to be held in the same division of the county where the conviction shall be made by any justice or justices in any petty sessions district, or to the recorder at his next sessions where the conviction shall be made by the divisional justices in the police district of Dublin metropolis, or to the recorder of any corporate or borough town when the conviction shall be made by any justice or justices in such corporate or borough town (unless when any such sessions shall commence within ten days from the date of any such conviction, in which case if the appellant sees fit, the appeal may be made to the next succeeding sessions to be held for such division or town), and it shall be lawful for such court of quarter sessions or recorder (as the case may be) to decide such appeal, if made in such form and manner and with such notices as are required by the Petty Sessions Acts respectively hereinbefore mentioned as to appeals against orders made by justices at petty sessions, and all the provisions of the said Petty Sessions Acts respectively as to making appeals and as to executing the orders made on appeal, or the original orders where the appeals shall not be duly prosecuted, shall also apply to any appeal made under this Act.

24. In any prosecution under this Act, where the fact of an article having been sold in a mixed state has been proved, if the defendant shall desire to rely upon any exception or provision contained in this Act, it shall be incumbent upon him to prove the same.

25. If the defendant in any prosecution under this Act prove to the satisfaction of the justices or court that he had purchased the article in question in nature, substance, and quality as that demanded of him by the prosecutor, and with a written warranty to that effect, that he had no reason to believe at the time when he sold it that the article was otherwise, and that he sold it in the same state as when he purchased it, proceedings shall be taken against the giver or givers of the warranty, and for the purposes of this Act the offence or alleged offence shall be deemed to have been committed within the jurisdiction of the court hearing the original summons against the vendor. And if it should be proved to the satisfaction of the justices that the article in question was incorrectly described by the warrantor, the person or persons who issued, gave, or uttered such warranty shall be guilty of an offence under this Act, and be liable to a penalty not exceeding fifty pounds, and in the event of the conviction of the giver or givers of the warranty, but not otherwise, the original defendant shall be discharged from the prosecution, but shall be liable to pay the costs incurred by the prosecution, unless he shall have given due notice to the prosecutor that he would rely on the defence of warranty.

Provided that no such defence under this section shall be admitted, unless the

defendant prove that the giver of the warranty is resident and trading within the United Kingdom.

The term "warranty" in this Act shall include any written or printed document, invoice or label, purporting to be a warranty, invoice, or descriptive label, but shall not include a mere verbal declaration.

In any proceedings against the giver or givers of any warranty under this section, it shall be no defence to plead that action was not taken within twenty-eight days from the time of the purchase of the sample, but in all cases action shall be taken within a reasonable time.

26. Every penalty imposed and recovered under this Act shall be paid in the case of a prosecution by an officer, inspector, or constable of the authority who shall have appointed an analyst or agreed to the acting of an analyst within their district, to such officer, inspector, or constable, and shall be by him paid to the authority for whom he acts, and be applied towards the expenses of executing this Act, any Statute to the contrary notwithstanding; but in the case of any other prosecution the same shall be paid and applied in England according to the law regulating the application of penalties for offences punishable in a summary manner, and in Ireland in the manner directed by the Fines Act, Ireland, 1851, and the Acts amending the same.

27. Any person who shall forge, or shall utter, knowing it to be forged for the purposes of this Act, any certificate or any writing purporting to contain a warranty, shall be guilty of a misdemeanour, and be punishable on conviction by imprisonment for a term not exceeding two years with hard labour.

Every person who shall wilfully apply to an article of food or a drug in any proceedings under this Act a certificate or warranty given in relation to any other article or drug, shall be guilty of an offence under this Act, and be liable to a penalty not exceeding fifty pounds.

Every person who shall give a false warranty in writing to any purchaser in respect of an article of food or a drug sold by him as principal or agent, shall be guilty of an offence under this Act, and be liable to a penalty not exceeding fifty pounds.

And every person who shall wilfully give a label with any article sold by him which shall falsely describe the article sold, shall be guilty of an offence under this Act, and be liable to a penalty not exceeding fifty pounds.

28. Nothing in this Act contained shall affect the power of proceeding by indictment, or take away any other remedy against any offender under this Act, or in any way interfere with contracts and bargains between individuals, and the rights and remedies belonging thereto.

Provided that in any action brought by any person for a breach of contract on the sale of any article of food or of any drug, such person may recover alone or in addition to any other damages recoverable by him the amount of any penalty in which he may have been convicted under this Act, together with the costs paid by him upon such conviction and those incurred by him in and about his defence

thereto, if he prove that the article or drug the subject of such conviction was sold to him as and for an article or drug of the same nature, substance, and quality as that which was demanded of him, and that he purchased it not knowing it to be otherwise, and afterwards sold it in the same state in which he purchased it; the defendant in such action being nevertheless at liberty to prove that the conviction was wrongful, or that the amount of costs awarded or claimed was unreasonable.

EXPENSES OF EXECUTING THE ACT.

29. The expenses of executing this Act shall be borne, in the city of London and the liberties thereof, by the consolidated rates raised by the Commissioners of Sewers of the city of London and the liberties thereof, and in the rest of the metropolis by any rates or funds applicable to the purposes of the Act for the better local management of the metropolis, and otherwise, as regards England, in counties by the county rate, and in boroughs by the borough fund or rate;

And as regards Ireland, in counties by the grand jury cess, and in boroughs by the borough fund or rate, all such expenses payable in any county out of grand jury cess shall be paid by the treasurer of such county; and

The grand jury of any such county shall, at any assizes at which it is proved that any such expenses have been incurred or paid without previous application to presentment sessions, present to be raised off and paid by such county the moneys required to defray the same.

BOARD OF REFERENCE.

30. There shall be appointed a board or committee, consisting of the chief chemical officer of the Inland Revenue Laboratory, a person nominated by the General Medical Council, three persons, being public analysts, nominated by the Local Government Board, and a person nominated by the Board of Agriculture. These appointments shall lapse triennially except that of the chief chemical officer of the Inland Revenue Laboratory, but the same persons shall be eligible for reappointment.

This Board of Reference shall be paid such remuneration as shall be decided by the Local Government Board, in consultation with the Board of Agriculture and the Treasury, and their duty shall be from time to time to examine and report on the composition of various articles of food and drugs, and to describe, investigate, and devise new or improved methods for their examination, to set forth definitions and exceptions, and to fix limits and standards of quality and purity.

The recommendations, definitions, exceptions, limits, and standards of the Board of Reference shall, on ratification by Order in Council and publication in the *London Gazette*, be binding in law, and shall continue in force until such Order in Council be rescinded, and the said committee shall meet together at least times annually for the purpose of consultation, and shall issue from time to time such new or revised regulations, definitions, exceptions, limits, and standards as they in their discretion may deem desirable.

SPECIAL PROVISION AS TO TEA.

31. From and after the first day of January, one thousand eight hundred and seventy-six all tea imported as merchandise into and landed at any port in Great Britain or Ireland shall be subject to examination by persons to be appointed by the Commissioners of Customs, subject to the approval of the Treasury, for the inspection and analysis thereof, for which purpose samples may, when deemed necessary by such inspectors, be taken, and with all convenient speed be examined by the analysts to be so appointed; and if upon such analysis the same shall be found to be mixed with other substances or exhausted tea, the same shall not be delivered unless with the sanction of the said Commissioners, and on such terms and conditions as they shall see fit to direct, either for home consumption or for use as ships' stores or for exportation; but if on such inspection and analysis it shall appear that such tea is in the opinion of the analyst unfit for human food, the same shall be forfeited and destroyed or otherwise disposed of in such manner as the said Commissioners may direct.

32. Tea to which the term "exhausted" is applied in this Act shall mean and include any tea which has been deprived of its proper quality, strength, or virtue by steeping, infusion, decoction, or other means.

33. For the purposes of this Act every liberty of a cinque port not comprised within the jurisdiction of a borough shall be part of the county in which it is situated, and subject to the jurisdiction of the justices of such county.

34. Every liberty having a separate court of quarter sessions, except a liberty of a cinque port, shall be deemed to be a county within the meaning of this Act.

35. The town council of any borough having a separate court of quarter sessions shall be exempt from contributing towards the expenses incurred in the execution of this Act in respect of the county within which such borough is situate, and the treasurer of the county shall exclude the expenses so incurred from the account required by section one hundred and seventeen of the Municipal Corporation Act, 1835, to be sent by him to such town council.

36. The town council of any borough having under any general or local Act of Parliament, or otherwise, a separate police establishment, and being liable to be assessed to the county rate of the county within which the borough is situate, shall be paid by the justices of such county the proportionate amount contributed towards the expenses incurred by the county in the execution of this Act by the several parishes and parts of parishes within such borough in respect of the rateable value of the property assessable therein, as ascertained by the valuation lists for the time being in force.

37. In the application of this Act to Scotland the following provisions shall have effect:

1. The term "misdemeanour" shall mean "a crime or offence";
2. The term "defendant" shall mean "defender," and include "respondent";

3. The term "information" shall include "complaint";
4. This Act shall be read and construed as if for the term "justices," wherever it occurs therein, the term "sheriff" were substituted;
5. The term "sheriff" shall include "sheriff substitute";
6. The term "borough" shall mean any royal burgh and any burgh returning or contributing to return a member to Parliament;
7. The expenses of executing this Act shall be borne in Scotland, in counties, by the county general assessment, and in burghs by the police assessment;
8. This Act shall be read and construed as if for the expression "the Local Government Board," wherever it occurs therein, the expression "one of Her Majesty's Principal Secretaries of State" were substituted;
9. All penalties provided by this Act to be recovered in a summary manner shall be recovered before the sheriff of the county in the sheriff court, or at the option of the person seeking to recover the same in the police court, in any place where a sheriff officiates as a police magistrate under the provisions of "The Summary Procedure Act, 1864," or of the Police Act in force for the time in any place in which a sheriff officiates as aforesaid, and all the jurisdiction, powers, and authorities necessary for this purpose are hereby conferred on sheriffs;

Every such penalty may be recovered at the instance of the procurator fiscal of the jurisdiction, or of the person who caused the analysis to be made from which it appeared that an offence had been committed against some one of the provisions of this Act;

Every penalty imposed and recovered under this Act shall be paid to the clerk of court, and by him shall be accounted for and paid to the treasurer of the county general assessment, or the police assessment of the burgh, as the sheriff shall direct;

10. Every penalty imposed by this Act may be reduced or mitigated according to the judgment of the sheriff;
11. It shall be competent to any person aggrieved by any conviction by a sheriff in any summary proceeding under this Act to appeal against the same to the next circuit court, or where there are no circuit courts to the High Court of Justiciary at Edinburgh, in the manner prescribed by such of the provisions of the Act of the twentieth year of the reign of King George the Second, chapter forty-three, and any Acts amending the same, as relate to appeals in matters criminal, and by and under the rules, limitations, conditions, and restrictions contained in the said provisions.

SCHEDULE I.

Form of Certificate.

To*

I, the undersigned, public analyst for the _____, do hereby
 certify that I received on the _____ day of _____, 18____, from†
 _____, a sample of _____ for analysis
 and have analysed the same, and declare the result of my analysis to be as follows :
 I am of opinion that _____

Observations.‡

As witness my hand this _____ day of _____,
 _____ A. B.,
 _____ at _____.

* Here insert the name of the person submitting the article for analysis.

† Here insert the name of the person delivering the sample, when known, or agency through which it was received.

‡ Here the analyst may insert at his discretion his opinion as to whether the mixture (if any) was for the purpose of rendering the article portable or palatable, or of preserving it, or of improving the appearance, or was unavoidable, and may state whether in excess of what is ordinary, or otherwise, and whether the ingredients or materials mixed are, or are not, injurious to health.

In the case of a certificate regarding any article liable to decomposition, the analyst shall specially report whether any change had taken place in the constitution of the article that would interfere with the analysis.

SCHEDULE II.

List of articles bearing a name identical with British Pharmacopœia remedies, but not required to be of B.P. quality.

SCHEDULE III.

Official definitions, limits, and standards of strength and purity adopted by the Board of Reference.

Spirits, as at present defined by the Amendment Act; milk; water in butter; lard; cheese; vinegar; impurities in tea, pepper, and other spices; drugs.